The Epidemiology of Infectious Complications after Transrectal Ultrasound-Guided Prostate Biopsy (TRUSB) in a Community Hospital Setting: To Screen or Not to Screen?

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Abstract (Modified)

Background
We evaluated the incidence of post-TRUSB infectious complications (ICs) at NorthShore University HealthSystem (NorthShore) in suburban Chicago to determine whether TRUSB is a safe procedure for men without a history of antibiotic exposure and for patients adopting targeted antimicrobial prophylaxis (AP), using rectal swabs prior to TRUSB.

Methods
We performed a retrospective study of men who underwent TRUSB between 1/1/07 and 12/31/12 at NorthShore (4,332 total). Chart review was performed on patients who either elected to be TRUSB or who were admitted within 7 days following TRUSB to be evaluated for IC. Demographic and clinical data were collected. Cases were defined as patients with positive cultures or a clinical infection. Geographically-weighted probability of TRUSB was estimated using geographical information system (GIS) analysis, and the prevalence (P) of ESBL-producing E. coli was estimated using the "kneading dough" method. Multivariate analysis was performed using a logistic regression model incorporating both independent and dependent terms.

Results
Annual results are in Table 1. Of the 6,912 men who underwent TRUSB, 26 (0.41%) returned to the ED or were hospitalized with 7 days for an infectious complication. The average length of stay was 3 days. 1 patient required ICU admission. No patients deaths occurred. 21/26 (80.7%) of patients had documented antimicrobial prophylaxis including (10 LEV/CEF, 6 LEV/CP, 5 LEV/CEF, 2 cefpodoxime, 1 ceftriaxone, 1 low dose gentamicin, 1 ceftriaxone/cefepime, 1 high-dose gentamicin, 1 vancomycin, and 1 mupirocin). However, sensitivity analysis revealed that post-TRUSB prophylaxis was not effective. Alcohol-based hand rub prior to TRUSB was not performed in all patients. The rate of post-TRUSB infections post-TRUSB was lowest for LEV/CEF (2/10, 20%) compared to LEV, CP, and CEF alone (5/10, 50%) and CEF/CP (2/10, 20%). The rate of post-TRUSB infections post-TRUSB was found to be significantly lower in patients who underwent TRUSB as an outpatient compared to those who underwent TRUSB as an inpatient (0.50% vs 1.50%, p<0.05).

Discussion
The rate of post-TRUSB ICs at NorthShore remains comparable to other rates reported in the literature (e.g., bacteremia 0.1-2.2%, NorthShore 0.8%). Combination prophylactic therapy with a fluoroquinolone and ceftriaxone may have prevented post-TRUSB ICs due to ESBL-resistant E. coli. However, this combination does not offer protection against ESBL- E. coli and is not in keeping with antibiotic recommendations for patients receiving two antibiotic regimens. While one might predict that post-TRUSB infectious complications due to ESBL- E. coli could be higher than the actual number of considered ESBL-ICs that occurred (bacteremia has been reported in >20% of patients who receive no prophylaxis); blood and urine cultures were not performed 100% of the time and a single set of blood cultures is not sensitive for detecting bacteremia, particularly in antibiotic exposed individuals. We predict that the incidence of post-TRUSB infectious complications due to ESBL- E. coli is likely to increase, mirroring that seen with fluoroquinolone-resistant E. coli and fluoroquinolone-resistant E. coli and that targeted prophylaxis based on racial screening can promote patient safety.

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References

The table below shows post-TRUSB infections and background antibiotic use.

Table 1: Post-transrectal ultrasound-guided prostate biopsy (TRUSB) infections and background antibiotic use.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>TRUSB Infections</th>
<th>Background Antibiotic Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEV/CEF</td>
<td>2/10 (20%)</td>
<td>5/10 (50%)</td>
</tr>
<tr>
<td>LEV/CP</td>
<td>2/10 (20%)</td>
<td>5/10 (50%)</td>
</tr>
<tr>
<td>CEF/CP</td>
<td>2/10 (20%)</td>
<td>5/10 (50%)</td>
</tr>
<tr>
<td>CEF</td>
<td>2/10 (20%)</td>
<td>5/10 (50%)</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>2/10 (20%)</td>
<td>5/10 (50%)</td>
</tr>
</tbody>
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Antiviral/Resistance
All rectal swab cultures obtained from men between 1/1/07 and 12/31/12 in which E. coli was isolated were evaluated for resistance patterns among susceptible isolates from post-2007 post-TRUSB isolated swab cultures obtained from patients undergoing TRUSB.

Analysis
Fisher’s exact test was used to calculate two-tailed p-values to evaluate differences in E. coli resistance patterns between patient- and ED-admitted patients.